

Zero Retries issue 0170 2024-09-20

Zero Retries is an independent newsletter promoting technological innovation that is occurring in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Radios are computers - with antennas! Now in its fourth year of publication, with 2100+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

In this issue:

- Request To Send
 - Paid Subscribers Update
 - Major Conference Countdowns
 - My Thanks to Dewayne Hendricks WA8DZP
 - More Complete ZR > BEACON Next Week
 - Background on my FCC Docket 24-240 Reply Comments
 - Last Possible Moment Reply Comment?
- A Few Good Comments on FCC Docket 24-240
 - Analogy - the 2.4 GHz Band is Also “Underutilized”
 - The Power Players In the 902-928 MHz Band
 - The non Power Players in the 902-928 MHz Band - Meshtastic and Amateur Radio
 - Drinking from a Firehose - Too Many Comments to Process
 - Individual Responses
 - Preparation for the Next Spectrum Assault
- Reply Comments of Steven K. Stroh Regarding FCC Docket 24-240
 - Abstract
 - Background
 - 902-928 Band Has Become the Starting Point of Personal Experimentation and Self Training in Radio Technology
 - Growing the Spectrum Workforce
 - Strategic Objective 4.1 | Attract, train, and grow the current and next-generation spectrum workforce.
 - Strategic Objective 4.2 | Improve policymakers’ understanding of spectrum considerations.
 - Strategic Objective 4.3 | Improve the public’s understanding of radio frequency spectrum and raise awareness of its role in everyday life.
 - In Conclusion
 - Managing the Radio Spectrum for the Broadest Possible Public Interest
- ZR > BEACON
 - WCF Experimenter Newsletter
 - The 18.25 meter dish in Wall Township, New Jersey, US (FN20xe) is expected to return to service on 1296 MHz before the end of 2024.
 - RPC Electronics SMT NinoTNC Going Out of Production
- Join the *Fun* on Amateur Radio
- Closing The Channel
- Footnotes for this Issue

- **Comments for This Issue** (redirect to Comments page)

Web version of this issue - <https://www.zeroretires.org/p/zero-retries-0170>

Request To Send

Commentary by Editor Steve Stroh N8GNJ

Paid Subscribers Update

My thanks to **Todd Willey KQ4FID** for *renewing* as a **Founding Member Annual Subscriber** to Zero Retries this past week!

Founding members are listed in every issue of Zero Retries!

My thanks to **Brian Webster N2KGC** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

Financial support from Zero Retries readers is a significant vote of support for the continued publication of Zero Retries.

Major Conference Countdowns

Pacificon 2024 in San Ramon, California, USA on 2024-10-18 thru 20 in 5 weeks. Tina KD7WSF and I plan to attend Pacificon 2024 (which makes it “major” to us).

My presentation at Pacificon 2024 - **Tracking Technological Innovation in Amateur Radio** will be on Saturday 2024-10-19 from 16:00 - 16:50 in Contra Costa Salon 2.

See the **Zero Retries Guide to Zero Retries Interesting Events** for additional events.

My Thanks to Dewayne Hendricks WA8DZP

As I have written substantively about the 902-928 MHz band this past month, I frequently think of my long time friend Dewayne Hendricks WA8DZP.

One of WA8DZP’s early Amateur Radio accomplishments was to port KA9Q’s TCP/IP package (originally written for MS-DOS) to the Macintosh, which was (I think...) the first implementation of TCP/IP running *on* the Mac. WA8DZP was instrumental in TAPR’s “focus on the future” in the late 1990s as illustrated in this prescient paper - [A New Vision for the Amateur Radio Service](#).

I first met WA8DZP at the 1996 Digital Communications Conference in Seattle, Washington when he was the featured speaker for the Sunday “Deep Dive” technical seminar. WA8DZP discussed the (then) new unlicensed “Part 15” wireless networking devices that were becoming available and could potentially be repurposed for Amateur Radio use. (This was way before 802.11 or Wi-Fi made such devices commonly used.)

While I was interested in WA8DZP’s claims about these Part 15 devices, based on my extensive background in Packet Radio, I was highly skeptical that “1 watt, 20 miles, 1 Mbps, on 902-928 MHz” was doable without extraordinary effort like using large, focused dishes to achieve that level of performance. But, I was lucky that my employer at that time had access to the pre-commercial Internet and I could use the NCSA Mosaic web browser. I started looking up some of WA8DZP’s statements and companies and units he referenced... and **WOW, he was right!** He wasn’t exaggerating his claims about those Part 15 devices.

It was a long and winding path from that Sunday, to becoming a writer about radio technology, and most recently Zero Retries. But, looking back, it’s easy to place the primary “pivot point” of becoming a writer back to that Sunday when I had my mind blown that an entirely new level of radio technology had become possible... that I became intensely interested in, thanks to WA8DZP.

Outside of Amateur Radio, WA8DZP was also [quite accomplished](#). But I was always humbled by WA8DZP’s acceptance of me as a peer. He would always take my call or reply to my emails. In the decades since that fateful Sunday in 1996, WA8DZP and I became friends and confidants, sharing our respective insights about radio technology, Amateur Radio, regulatory issues, and general technology, and life.

Live Long and Prosper, Dewayne! 🙌

Update - I wrote the above earlier this week after learning that WA8DZP was suffering a likely terminal illness, and I just wanted to publicly say Thanks to him, without saying too much as he wasn’t making his illness publicly known.

As I was finishing this issue of Zero Retries, I was informed that Dewayne Hendricks WA8DZP became a silent keyboard today, painlessly, after a brief illness. I’m blessed that I talked to him yesterday and got to tell him the gist of the above, and how much I valued our friendship over the decades. I also told him, in total sincerity, that he had made his own unique dent in the universe, *that only he could have done*, and that I was blessed to be his friend. I will *profoundly* miss my friend Dewayne.

Dewayne was one of the earliest, and *the* most impactful “cheerleader” when I began Zero Retries, but he didn’t want to be publicly acknowledged - he preferred to remain in the background. I am forever indebted to him for that early influence on Zero Retries and sharing his very broad and deep knowledge and perspective. He was usually the first to click “Like” when I published each issue of Zero Retries and he told me that he waited eagerly for each new issue. I will miss seeing that “Like” show up, often within minutes of auto-publishing at 15:30 Pacific.

I’ll have a longer Silent Keyboard memorial to Dewayne in next week’s Zero Retries.

Update: That memorial is now online in **Zero Retries 0171** - Dewayne Hendricks WA8DZP is a Silent Keyboard.

More Complete ZR > BEACON Next Week

ZR > BEACON is usually the last section of Zero Retries I edit before publishing. There were at least ten items queued up for possible mention in ZR > BEACON in this issue, but receiving the news about the death of my friend Dewayne Hendricks WA8DZP has admittedly thrown me for a loop. I mentioned to one of the people who informed me about Dewayne's death that I was reviewing the last paragraph of my Docket 24-240 Reply Comments and they said "He would have wanted you to finish that and get it filed with the FCC". They were right, and so I did. So, getting that done, and making this issue of Zero Retries minimally presentable is all I have the mental bandwidth for at the moment. Next week will be better.

Background on my FCC Docket 24-240 Reply Comments

My apologies for overpromising and underdelivering this week. I intended to publish this issue of Zero Retries earlier than the usual 15:30 Pacific on Friday, but I am actually publishing this issue late on Friday. As you read above, it's been a bit of a week for me.

And, of course, my apologies to Zero Retries readers outside the US, for whom the majority of this issue's content isn't very relevant. Things should be "back to normal" next week... or at least what passes for "normal" here in Zero Retries.

The FCC already has *ample* comments now, from many organizations and individuals with standing, on the specific questions the FCC asked in Docket 24-240, so I didn't feel the need to "sing in that particular chorus".

FCC Comment and Reply Comment periods are rare for any FCC issues that involve Amateur Radio - we're kind of "down in the noise floor" for the FCC's attention. Thus when Amateur Radio does have that rare moment of "attention" from the FCC, I feel we (and I) should make the most of it. Thus I ended up spending a lot more time than I originally intended in crafting my Reply Comments.

I began to write my Reply Comments here in Zero Retries, and I created lots of good discussion points that I had intended to include... and then time drew short. So, what you'll read in the two articles has some overlap, but also a lot of divergence. If I had the time... *if I had made the time*... I would have merged, and condensed, and heavily edited the two "versions" of my thoughts on Docket 24-240.

With time getting short in order to file by end of day 2024-09-20, I decided to direct my FCC Docket 24-240 Reply Comments from a unique perspective in discussing the unappreciated role of the 902-928 MHz band as a "Citizens Data Band" and that it's a low barrier to entry way to learn about and experiment with radio technology. I suspect the FCC Commissioners are going to be surprised that so many individuals care about the 902-928 MHz band and this "Meshtastic" system that they've likely never heard about until receiving comments on Docket 24-240.

Last Possible Moment Reply Comment?

If after reading this issue, and you decide you would have wished to file a Reply Comment on Docket 24-240... ***please do so*** (in the next few days).

It can't hurt, and every little bit might help, even if the FCC ultimately decides not to "disseminate" (formally consider) late Reply Comments.

FCC Electronic Comments Filing System (ECFS) - [Submit an Express Comment](#)

In the **Proceedings** field, type (slowly) 24-240. The system should find the proceeding - just click on the result.

In the text box, I suggest stating "Reply Comment".

And if you're tempted to use a pseudonym or "Anonymous", I advise not to bother to file comments. If I were the FCC, I would simply discard such comments as not credible, that someone didn't care enough to use their real name.

Have a great weekend, all of you co-conspirators in Zero Retries Interesting Amateur Radio activities!

Please tell your closest friends that they *matter* in your life. I'm very, very glad that I took those few moments to do so yesterday, just in time.

Steve N8GNJ

Leave a comment

Share



Image courtesy of Meshtastic

I decided to feature the Meshtastic logo in this issue because the development of Meshtastic is mentioned so prominently in my Docket 24-240 Reply Comments.

A Few Good Comments on FCC Docket 24-240

By Steve Stroh N8GNJ

With over ~~1500+~~ ~~1600+~~ 1700+ Comments and Reply Comments and increasing until the end of the Reply Comments period on 2024-09-20, it's become impossible (for me as an individual) to do more than a cursory survey of comments filed with the FCC on Docket 24-240. What follows is a personal perspective based on the comments I was able to review.

After reading hundreds of Comments (and very few Reply Comments), I'm cautiously optimistic that the FCC has received ample substantive comments that will provide it sound reasoning to deny NextNav's request to radically reconfigure the 902-928 MHz band to NextNav's proprietary advantage. NextNav proposes to operate high power transmitters in its new exclusive allocation of 918-928 MHz and *compact all non-NextNav activity into an 11 MHz band - 907-918 MHz.*

Based on the number, and quality of the comments in Docket 24-240, the most provably inaccurate statement in [NextNav's original filing](#) is the statement:

The Lower 900 MHz Band is an ideal candidate for swift FCC action as it is **currently underutilized** due to an outdated band plan and technical and service rules that limit the use of the band for fifth-generation ("5G") technologies.

"Currently underutilized" *only* from the perspective of NextNav's proposed usage of Positioning, Navigation, and Timing (PNT). NextNav attempts to ignore the hundreds of companies, organizations, and user communities, and the hundreds of systems and networks, and billions of devices that are in 24 x 365 use in the 902-928 MHz band.

Analogy - the 2.4 GHz Band is Also "Underutilized"

I offer a brief analogy to NextNav's logic that the 902-928 MHz band is underutilized. The 2.4 GHz band could also be considered underutilized because [the lower half of the 2.4 GHz band is allocated to Amateur Radio as primary \(or secondary\) usage, and the upper half of the 2.4 GHz band is allocated for "mobile broadcasting" \(such as a point to point link from a "news" helicopter to a receiver to provide a live video feed\) as primary \(or secondary\) usage.](#) Paying attention to only *those* usages, one could posit that the 2.4 GHz band is "underutilized". But not only is 2.4 GHz used for Amateur Radio and "mobile broadcasting", it's used for wireless networking (Wi-Fi), and even video transmission (wireless cameras). But likely the biggest use, by numbers (*tens, or hundreds, of billions of devices*) of 2.4 GHz is *Bluetooth*, which by NextNav's logic of "utilization", would be completely invisible as a use case for 2.4 GHz.

If the FCC were to reconfigure the 902-928 MHz band per NextNav's request, doing so would irrevocably damage thousands of unlicensed (Part 15) and secondary user groups such as Amateur Radio (Part 97). Not to mention render obsolete *literally* billions (not hyperbole... *billions*) of electronic devices.

I think we "incumbents" of the 902-928 MHz band are lucky that NextNav's attempt on the 902-928 MHz band is, in the end, terribly clumsy, if not

desperate, and a transparent “spectrum snatch” or as EFF put it, a “Band Grab”.

Electronic Frontier Foundation (EFF) has weighed in with a substantive article - [NextNav's Callous Land-Grab to Privatize 900 MHz](#):

NextNav's Proposed 'Band-Grab'

NextNav wants the FCC to reconfigure the 902-928 MHz band to grant them exclusive rights to the majority of the spectrum. The country's airwaves are separated into different sections for different devices to communicate, like dedicated lanes on a highway. This proposal would not only give NextNav their own lane, but expanded operating region, increased broadcasting power, and more leeway for radio interference emanating from their portions of the band. All of this points to more power for NextNav at everyone else's expense.

This land-grab is purportedly to implement a Positioning, Navigation and Timing (PNT) network to serve as a US-specific backup of the Global Positioning System (GPS). This plan raises red flags off the bat.

Dropping the “global” from GPS makes it far less useful for any alleged national security purposes, especially as it is likely susceptible to the same jamming and spoofing attacks as GPS.

[NextNav itself](#) admits there is also little commercial demand for PNT. GPS works, is free, and is widely supported by manufacturers. If NextNav has a grand plan to implement a new and improved standard, it was left out of their FCC proposal.

What NextNav did include however is its intent to resell their exclusive bandwidth access to mobile 5G networks. This isn't about national security or innovation; it's about a rent-seeker monopolizing access to a public resource. If NextNav truly believes in their GPS backup vision, they should look to parts of the spectrum already allocated for 5G.

In the end, NextNav was only able to garner perhaps a handful of supportive comments. This was the only supportive comment that I saw:

California Fire Chiefs Association

September 13, 2024

Re: Comment on NextNav Petition for Rulemaking; WTDocketNo.24-420; RM-11989

Dear Ms. Dortch:

First responders depend on accurate information to deliver prompt assistance to building occupants and maintain situational awareness in the process. Firefighters, for example, can face zero-visibility conditions in structure fires from smoke and blackout conditions from electrical outages. Having the support of a terrestrial geolocation system that can accurately identify the location of people inside a building could avoid dangerous and time-consuming searches in the wrong areas and accelerate the delivery of life saving assistance to people who need it.

We have firsthand experience with degradation of GPS due to the “urban canyons” and dense environment we cover, a problem that is ideally resolved by a terrestrial PNT service of this type proposed. Having the z-axis requirement as the Commission does is highly important to our operations, and while the 3-meter requirement is a great step forward, the x/y location from GPS is not sufficient for our operations and is sporadic and inconsistent in our region on a daily basis. The ability to have a consistent x/y signal that most importantly penetrates buildings, which these frequencies will accomplish, is truly a gamechanger for the fire service and one which will save lives, reduce time to victim and gain critical situational awareness of where our fire fighters are during an emergency.

NextNav's approach could improve the availability and accuracy of indoor geolocation. I would like to encourage the Commission to proceed forward on this matter as the potential benefits to Public Safety are important to our agency and stakeholders.

Respectfully
Mark Heine, President
California Fire Chiefs Association

Even with this supportive letter, it seems that Heine or the CFCFA staff relied solely on NextNav's highly optimistic potential capabilities in the formation of Heine's letter. The requirement for “higher precision Z axis positioning” has been known for some time, and the US cellular industry has been working on this issue - [Wireless Industry's Z-Axis Achievement Provides Accurate Vertical Location for 9-1-1 Calls](#). To cite another example, if the California Fire Chiefs Association was truly interested in having a better geolocation capability, especially in urban areas, they would be investigating the emerging [Broadcast Positioning System \(BPS\)](#) that is one of the subsystems of ATSC 3.0 television transmissions. Not to mention that NextNav's system will be proprietary and fee-for-service.

The Power Players In the 902-928 MHz Band

Radio Frequency Identification (RFID)

The application I was not aware of that is the primary user of the 902-928 MHz band in sheer numbers (billions of “devices”) are the two major applications of Radio Frequency Identification (RFID). Basically, RFID is a passive electronic circuit that when “excited” by a radio transmitter, gathers enough energy from the transmission for the circuit to transmit briefly with a unique ID number.

RFID using the 902-928 MHz band is used very widely for logistics, for units as large as shipping containers, inside warehouses, and all the way down to retail use on individual products. RFID tags can be very compact and can be pasted into a hardcover book.

RFID using the 902-928 MHz band is apparently the primary method of automated vehicle tolling, such as “E-ZPass”.

Both of those applications had many, *and very substantive*, professional comments submitted that if NextNav's proposal was enacted, the requirement to change the existing systems would be... incalculably expensive... with no equivalent capability to convert to. Many stated that the very high power transmissions that NextNav proposes would render the 902-928 MHz band completely unusable for their current technology. RFID depends on being able to receive a very low power “response” transmission from the RFID “tags”, and anywhere near a NextNav high power transmitter, an RFID system operating on the 902-928 MHz band would probably be unable to operate, at least with the current technology.

Automatic Meter Reading

As expected, the utility industry provided comments that very large utility monitoring systems consisting of tens of millions of devices had evolved on the 902-928 MHz band, all of which would have to be replaced, and the entire radio infrastructure for those tens of millions of devices would also have to be replaced.

Z-Wave / Commercial Infrastructure Management

Another application operating in the 902-928 MHz band I was only partially aware of was [Z-Wave](#). I was aware that Z-Wave was a home automation system, but I was unaware that Z-Wave was used in commercial and industrial applications, especially management of large lighting systems in commercial office buildings, factories, and warehouses. One comment I read stated that Z-Wave is embedded deep into the infrastructure of such facilities and it would be incalculably expensive to replace, and likely impossible to use the current Z-Wave technology in the 902-928 MHz band with NextNav's high power transmitters.

Many commenters made reference that the 902-928 MHz band is a delicate balance of applications and differing technologies that have "spread out" across the 26 MHz of spectrum in the 902-928 MHz band. Most notably, commenter (that I saw), especially those that were using the 902-928 MHz band commercially, complained that 902-928 MHz was unusable. Quite the opposite - they cited their very committed, profitable, highly effective use the 902-928 MHz band for their products and systems.

Internet of Things

There were many Internet of Things comments including comments from Wi-Fi related organizations discussing the recent popularization of 802.11ah / HaLow standards, and a lot of mentions of the use of Semtech's LoRa technology (for its originally intended purpose - low bandwidth, long range control and monitoring of systems with low cost hardware).

Surprisingly, despite using the 902-928 MHz band for its [Sidewalk network](#), Amazon didn't provide its own comments (that I saw). It may well have commented as part of an omnibus comments like that of the [US Chamber of Commerce](#).

The non Power Players in the 902-928 MHz Band - Meshtastic and Amateur Radio

As far as I can tell (again, I can only do cursory surveys of names of commenters, and a few targeted searches), the only two Amateur Radio organizations who commented are Open Research Institute (ORI) and ARRL. Kudos to both of those organizations *for showing up*.

Excerpt from [ORI's comment](#) (by Ed Friesema, Michelle Thompson, and Matthew Wishek):

Current Amateur Radio use of the band includes point-to-point links, amateur television stations and repeaters, and voice repeaters. Some of the amateur repeater systems on 900 MHz are linked and serve a wide area (<https://www.scrba.org/BandPlans/33cm.htm>). Recent Amateur Radio experimental use of the band includes a variety of modern and innovative digital modes, including MMDVM and our own Opulent Voice protocol (<https://www.openresearch.institute/2022/07/30/opulent-voice-digital-voice-and-data-protocol-update/>). The open source amateur transceiver project Faraday RF was designed for 900 MHz (<https://github.com/FaradayRF/Faraday-Software>). Amateurs operate DMR and P25 repeaters in this band. Below is a list of amateur P25 repeaters just in Colorado. (https://www.repeaterbook.com/repeaters/feature_search.php?system=The%20900%20P25%20Network%20System&state_id=%25&type=systems)

Unfortunately, most of ORI's comment was attacking the validity of NextNav's claims instead of promoting more of the "Open Source innovation" that (in my opinion) would have been more impactful because of ORI's mission.

Excerpt from [ARRL's comment](#) (by David R. Siddall)

The Amateur Radio Service uses of this band are important and even critical for some purposes, but reality also is that sometimes use by Radio Amateurs has been impaired or made impossible by there being so many other transmitters operating within the band. Amateurs employ this band when technically feasible, but not infrequently Amateurs have been unable to fit in a signal without causing interference to a higher-allocated service.

It therefore raises eyebrows when Radio Amateurs read NextNav's statements that the band is under-utilized. Our operators use the band when and where they can find space, but many report that there are so many signals already in the band that they have had to search out other less desirable frequencies or, in some cases, design and build highly directional antennas and special equipment to accomplish their purpose.

Kudos to Siddall for his economy of thought and keeping ARRL's comments focused on data that's relevant to Amateur Radio where it has standing. This is the kind of "ground truth, *from standing*" that in my opinion is potentially impactful to the FCC in their deliberations. Contrary to NextNav's asserting that their reconfiguration plan would have little impact... that plan would have *enormous* impact because of the myriad... literally uncountable... uses.

Drinking from a Firehose - Too Many Comments to Process

This is my first experience trying to offer substantive comments in a popular... populist... proceeding with the FCC and trying to follow all the comments in order to formulate my substantive comments. It's essentially impossible for one person, working on one's own time, to do more than a cursory survey of all the comments, in the time allotted by the FCC. Of course, this isn't news to those professionally involved in "Communications Law" regarding the FCC. This is how / why the professional Washington DC communications Law Firms earn their high pay. Communications law firms must have an automated process to do this, or at least marshal their staff members to pore through all the comments, or perhaps hire temporary staff to comb through all of the comments in order to winnow out the few substantive comments that justify a reply comment, either negative or positive.

At least, this process is impossible for a non-professional individual in the timeframe allowed by the FCC... and have any kind of other life. The FCC's system is just byzantine to navigate - you cannot "dump" all of the comments; you can only "dump" a csv file, or have an RSS feed. You then have to open each commenter's link and save that individually, though I suppose an AI system could be used to do this process.

Individual Responses

Most of the individual responses were pleas not to disrupt the status quo of their Amateur Radio activities or their Meshtastic activities. Many Amateur Radio Operators who commented made the fundamental mistake of positing that the 902-928 MHz band was an Amateur Radio band. *That is not the case*

- Amateur Radio has secondary privileges in the 902-928 MHz band, but it is not an Amateur Radio band such as 144-148 MHz and 222-225 MHz where Amateur Radio is primary.

One major goof I saw was addressing the FCC as:

Gentlemen...

This was a bit tone deaf considering that the current Chairperson of the FCC is a woman (Jessica Rosenworcel) and one of the Commissioners is a woman (Anna M. Gomez).

It was surprising to see how many commenters made pleas not to disrupt their use of Meshtastic, and most commented that a primary use of their Meshtastic systems are for emergency communications "off grid".

I saw references in comments to regional emergencies such as hurricanes, wildfires, and flooding, all of damage infrastructure, especially communications infrastructure.

First responders have access to FirstNet, a hardened, prioritized cellular service operated by AT&T. Ordinary citizens have no equivalent "network of last resort"... or at least they didn't until Meshtastic was developed. Meshtastic is being used in (preparation for) emergency scenarios by ordinary citizens because it is inexpensive to buy individual nodes and *doesn't depend on infrastructure*. Meshtastic's relay (mesh) functionality is automatic, and it can easily be deployed by individuals or in groups such as a neighborhood.

The cellular companies will say that this type of communications innovation using unlicensed spectrum isn't needed - they can "quickly" restore cellular service using emergency systems such as "Cells on Wheels". And yet, in *every* regional emergency event - hurricanes, wildfires, and flooding, cellular systems are one of the first infrastructures to be affected.

A few commenters made references to actual use cases - inter family communications in areas where cellular coverage is intermittent or often disrupted by regional emergencies such as hurricanes, wildfires, and flooding. Some examples:

[Ricky Wilson:](#)

My family rely on 915mhz lora and meshtastic to help manage our domestic animals and homestead as well as alternative communications for family and friends during emergencies.

[Frank Christel:](#)

Please don't allow NextNav Inc. to cripple the 902-928 MHz band's usage. Their proposal has the potential to disrupt LoRaWAN devices including Meshtastic network radios. Meshtastic technology is just now beginning to see adoption across Oklahoma. There is no less expensive way for citizens to create decentralized and community-driven communication networks. Granting exclusive or prioritized access to NextNav could stifle open-source innovation and undermine community resilience and public safety, particularly in disaster-prone or remote areas in Oklahoma.

[William T Burke](#)

Pave PAWS Beal Air Force Base has limited and eliminated many 70 centimeter systems regarding Amateur Radio in this geographical area. 902-928 MHz became the alternative and 20 years of development by civilian Amateur Radio groups have created very advanced systems in this spectrum. Interstate linking and high level coverage to provide excellent emergency assistance to the American civil population would be eliminated by this proposal. There are thousands of skilled Amateur Radio operators operating within this 26 MHz allocation. We've worked hard over the last 20 years at no cost to the American taxpayers in development and in these uncertain times globally our efforts are highly useful in a catastrophic event. These advanced and skilled Amateur Radio groups/individuals are beyond the average appliance operators of the Amateur Radio Fraternity and deserve consideration in regard to technical excellence. This small slice of spectrum contains the most useful and reliable backup interstate communication systems within the USA. No other Amateur Radio spectrum allocation in VHF or UHF compares to what has emerged in the 902 to 928 spectrum in the past 20 years. The modified and converted commercial radio equipment occupying this slice of spectrum is mil-spec equipment by many standards. The technical workmanship by advanced Amateur Radio operators sets this spectrum allocation into a different category of advancement and functionality. It has stellar merit and deserves considerable protection. Respectfully WA6Q

There were also a number of commenters who referenced *both* their Amateur Radio and their Meshtastic use of the 902-928 MHz band. I think some of the most impactful comments will be those that reference how Meshtastic is proving to be a useful "hook" in getting people, especially young people, interested in radio technology and perhaps Amateur Radio.

A trusted advisor to Zero Retries stated that the FCC does not care about "hobbyist" use of bands like the 902-928 MHz band, especially when tens or hundreds of millions of dollars of potential new investment by NextNav and others hangs in the balance of the FCC's decision. But self education in radio technology, and critical shortage of the US "Spectrum Workforce" does matter to the US Federal Government. Thus I think these references to Meshtastic that reference self-education do merit some consideration, such as these comments:

[Catherine Strobel](#)

Please do not interfere with the Meshtastic system. It has been such a wonderful way to get our daughter interested in digital modes as an offshoot from amateur radio. It is a good thing to grow this endeavor for our children. Thanks for your consideration.

[Dylan Durst KN6QQQ](#)

18170 Basil Drive
Tehachapi, CA 93561
September 4, 2024

Federal Communications Commission
45 L Street, NE
Washington, D.C. 20554

I have been using the Lower 900MHz band as an unlicensed Part 15 user for almost 35 years, it was the first band I gained experience on, and lead me to a life long fascination with radio, communications and signaling that I apply what I learned daily as a professional Software Engineer, Open Source Software volunteer contributor, licensed Amateur Radio Operator and Amateur Radio Volunteer Examiner, and Meshtastic Network Operator.

Specifically, **the lower 900MHz band has been undergoing a technological Renaissance in recent years**, and ultimately lead me to become an Amateur Radio Operator. This particular bit of spectrum lives at the intersection between:

1. Extremely low cost radios with on board micro-controllers with a smooth and low-cost supply chain.(1)
2. Shared and collaborative operation with Amateur Radio operations.
3. Extremely low power operation with comparatively long range.
4. An extremely innovative community using this part of the spectrum under Part 15 more and more every day.

Overall, it provides a much better learning path than unlicensed microwave operation for those who are a novice in the field. This allows me to provide others with a path for independent discovery and education similar to the one I took when I was younger.

Nobody needs to look very far to see these applications in practice, but I can enumerate a couple applications that I use for day to day operations within my community, under Part 15 usage:

1. The WiFi Alliance's 802.11ah (HaLow) standard
 1. Which allows for network bridging across a variety of rural situations that microwave is not a good fit for, providing a way for rural communities to side step having to using LTE and expensive proprietary platforms.
2. Meshtastic (and similar Open Source projects)
 1. A peer-to-peer meshing radio application that provides nearly unlimited educational and research opportunities in some of the most critical applications of Distributed Systems today:
 1. Peer to Peer message routing.
 2. Backwards compatible message encapsulation for long lived deployment.
 2. An extremely low cost barrier of entry, as low as \$10-\$15 to get started (if not cheaper).
 3. A completely Open Source ecosystem.
 4. Immediate entry points for Electrical Engineers, Radio Engineers and Software Engineers to collaborate, learn from each other, and contribute towards a better community operated network.(2)

Because of the overlap with Licensed Amateur Radio operations, it becomes a quick way to get started using modern networking and distributed systems technologies on radio, at such a low cost, without having to be licensed at all. The educational path does lead users into becoming licensed, and learning and developing their skills more. There is no similar overlap in any other band. This is the current on-ramp band for innovation.

On the supply chain side of things, current Amateur Radio operators can use off-the-shelf hardware in this band for digital operation, with simple power adjustments to meet their needs, and coordinate and work with unlicensed operators collaboratively. This is not the case with unlicensed Part 15 Radio Operation, where Amateur Radio Operators need to also be Software Engineers and Electrical Engineers to change the frequency on hardware not designed for the task, or purchase much more expensive hardware, designed for the specific task. This shared region of overlap reduces waste and redundancy, and saves independent innovators money.

Without any doubt, the proposed change, would open the doors to:

1. Close the on-ramp to innovation happening in radio communications today, and close doors on educational opportunities.
2. Impact the entire Lower 900MHz Band Supply Chain, drastically increasing cost even for Amateur operators.
3. Drown out a large but unknown number of Part 15 users in this space.
4. Shut down the convergence of folks who are older and know a lot about radio, interacting with younger folks who know a lot about digital networking.

While I don't see NextNav petition as anything more than a spectrum grab at the cost of millions of everyday users of the band, and I would be incredibly surprised if their petition were approved by The Commission, I did feel the need to represent how this particular bit of spectrum has impacted my life, and how I see it impacting that of others.

Most people who are using the 900MHz band don't even know they are using it, and they certainly aren't going to be educated about using it within this short commentary period.

As for why they will need to buy a replacement item for something that has worked for years and years, the phrasing "will work with unlicensed users," in my book, means that they will just be told they can no longer use their hardware, or it just won't work anymore and they will never know why.

I support Meshtastic Communities' Formal Opposition to the change, and I will probably also support the ARRLs upcoming commentary.

Sincerely,

Dylan Durst / KN6QOQ

(1) Any attempt to relocate usage, will increase costs.

(2) One person having all 3 of these skill sets is already extremely rare, but those are the only individuals who would be able to innovate in this space, if this on-ramp is closed.

Matthew Leavitt:

This proposal to reshape the 900 MHz band would be extremely damaging to the purpose of amateur radio, and would stall existing projects using this band. I have been involved with my school's amateur radio club and the interest in radio has exploded in the last few years. However, we have not had as many people get their license and further their education in radio technologies because of the licensing requirement. Meshtastic and other technologies fill a gap between obtaining a license and knowing nothing about radio. It provides a way for people to easily approach radio and learn the basics by hands on experience outside of normal club meetings, at very low cost. These frequencies should remain open and free from interference to further the development of new radio technologies and interest in said technologies.

Douglas Datwyler

Comments for FCC WT Docket No. 24-240 and RM-11898

My name is Douglas Datwyler.

I urge the FCC reject the petition by NextNav to "reconfigure" the low 900 MHz band (from 902 to 928 MHz) band.

1. I am a licensed amateur radio operator (WR7O), and I believe firmly in the purposes of Amateur Radio as listed in FCC 97.1, especially 97.1(b) and 97.1(c):

- 97.1(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

- 97.1(c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.

I am currently engaged in experiments with digital modes (FSK, GFSK) and antennas in the 902 to 928 MHz band. The NextNav action will curtail my uses of 900 MHz in part 97.

2. I have in my home an older 900 MHz DECT telephone. This phone is a lifeline for my family as cellular coverage can be spotty. This phone is likely to fail under the conditions of the NextNav system being active.

Chris Crandon:

The frequency range in question in the lower 900MHz range has been an area of huge enjoyment for me and many members of my community. I and others who share the same interests in small hobby electronics, communication and computers have spent the our valuable free time (and not to mention a lot of money) building small electronic devices that we can make do a lot of really fun and cool things over these frequencies. For one, I have been able to create my own small network within my neighborhood that can connect both my wife and I while we are at work since cell reception is lacking. I have also created a mobile gps device for both our vehicles which acts as a safety backup in case either of us need to know location or if our vehicle is stolen. There are many more things I would love to experiment with and eliminating this frequency range from amateur and hobbyist use will completely erase everything I have spend all my spare time and enjoyment creating. Our devices are hardwired to operate on this frequency and would render them completely useless. Aside from that, we don't need more corporate capture of what limited space us as hobbyists and makers have to work with! I urge anyone reading this to oppose this proposal and effectively protect this space on the RF spectrum that is growing every day in the amateur space! Thank you -Chris

Brian Ramos:

As a ham radio operator, volunteer firefighter/EMT, CERT Team member, and former Search and rescue technician; I am obviously very keen on emergency preparedness, but also innovation. I live in Napa Valley, as the name suggests, being nestled in the valley means Line of sight RF transmissions are difficult. In order to enable communications, Towers are set up throughout the valley on ridgetops to be able to communicate vital information. The Nunn, Atlas, and Lightning complex fires severely limited access to these towers, knocking out cell communications, radio broadcasts, and more for several days. The ongoing Airport Fire threatened the same. Due to the nature of centralized communication structures, Major threats exist to otherwise unpopulated land. This is resource intensive. The bandwidth in question has been used to create low powered, redundant, reliable mesh communications networks to circumvent the need for communications, an open source passion project for Hobbyists. Right now this worldwide network is in its growth phase, but if better established, would revolutionize emergency management. But Hobbyists don't generate revenue, so who cares? Well, they generate technology. Another hobby I'm a part of is building and flying multirotor sUAS (drones). A decade ago, I thought they were a fun diversion. Today, my mostly open-source hobby acts as a force-multiplier like never before, completely upturning military doctrine and revolutionizing the battlefield. By locking out American citizen's ability to tinker in their free time, American's will be on the back foot. We will be forced to rely on foreign experts to develop costly solutions to problems that are unfamiliar to everyday Americans. People who would otherwise be subject matter experts will be relegated to sending CW messages using 100 year old technology. This is how NOT to create knowledgeable young Scientists, Engineers, and technicians. Allowing technology to expand abroad, but limiting access on our home soil creates a defense risk.

Preparation for the Next Spectrum Assault

In the time allotted by the FCC, trying to publish something to Zero Retries and file my reply comments, it was impossible to read and keep track of all of the comments that came flooding in, especially after the EFF published their article and motivated many individuals to file comments.

On behalf of Amateur Radio and related radio-based communities such as personal communications (users of CB, GMRS, MURS, FRS, etc.), it's worrisome to me that it has become so tough for individuals to provide substantive comments that will receive serious consideration by the FCC. When the next band is targeted for "commercial innovation" by "sharing" or attempting a complete takeover... *and there will inevitably be a next one...* it's

become apparent to me that all such a company has to do to “flood the FCC” with comments would be to create a fake organization and use social media to incentivize massive numbers of individuals to file comments. Such a situation would be a severe challenge to respond substantively.

Amateur Radio can no longer rely on the ARRL for guidance on commenting to the FCC. Increasingly, ARRL’s reaction time is too slow and its perspective isn’t modern enough. For example, in FCC Docket 16-239, the ARRL requested that the FCC remove archaic symbol rate limits on the HF bands so that Amateur Radio Operators could use Pactor 4 modems. But the ARRL’s request was only for the HF bands - they completely ignored that archaic symbol rate limits were also in place on Amateur Radio VHF and UHF bands.

And, increasingly, ARRL only files their comments at the last minute, which doesn’t provide sufficient time and guidance for others to offer their comments.

Thus I think a group needs to be formed to make ready for “the next one”. The closest analogy to what I think is needed is [Archive Team](#), which is a loose affiliation of individuals with organization and resources to download and locally store portions of large online systems that are, or are likely to be removed from online access. Members of Archive Team are “on standby” until they’re “activated” and then begin to “divide and download” by each individual focusing on selected portions of that system.

The part I think is most applicable to “Comment Team” is the “coordinate, divide, and download” approach. There has to be a way to automate the downloading of FCC comments, perhaps in chunks of 25 comments, and be able to centrally track whether a comment is substantive, or not, approves or disapproves of the requested change, worth filing a Reply Comment, or not, etc. Each member of “Comment Team” can check into the system, download a “chunk”, upload their summarization of the comments in their chunk, etc.

Members would have to be vetted and trusted in advance. A “ringer” that’s involved in “Comment Team” could cause a lot of harm.

Based on the low number of comments on Docket 24-240 filed by Amateur Radio organizations, another reason for forming “Comment Team” would be to assist Amateur Radio organizations to develop and file comments in a timely manner. They would keep various Amateur Radio organizations in mind, perhaps create a prototype comment that would reflect an organization’s perspective, and then offer it to that organization so that all they would have to do to file a comment is to edit the wording and then submit that edited version. Hopefully that assistance would improve the number of Amateur Radio organizations that file comments on behalf of Amateur Radio.

Leave a comment

Share

Reply Comments of Steven K. Stroh Regarding FCC Docket 24-240

By Steve Stroh N8GNJ

This is the text of my formal [Docket 24-240 Reply Comment filing to the FCC](#), which was acknowledged by the FCC as being received. I submitted it after business hours Eastern (Washington DC) time. I expect... hope... that my Reply Comment will be updated to “Filing Status DISSEMINATED” on Monday since the date stamp shows that it was filed on 2024-09-20, which was the deadline for Reply Comments.

Submitted 2024-09-20 via the FCC Electronic Comments Filing System as a PDF file, filename FCC_24-240_Reply_Comments_Steven_K_Stroh_2024-09-20.

Original Comment on Docket 24-240:
Submission ID: 10905537208674
<https://www.fcc.gov/ecfs/document/10905537208674/1>

Abstract

I recommend to the Commission that NextNav’s request to reconfigure 902-928 MHz should be denied. Denying NextNav’s request and maintaining the current configuration of 902-928 MHz would serve the broadest possible public interest of the American businesses and individuals.

The Commission has received ample evidence in Comments filed by numerous organizations that *thoroughly* refute NextNav’s contention that the 902-928 MHz band is “currently underutilized”.

Thus the Commission is now confronted with a major decision - whether to accept NextNav’s request which may create a new class of terrestrial Positioning, Navigation, and Timing (PNT) service. However, to do so would come at the well-documented enormous cost of disrupting thousands of existing, working, revenue producing systems and businesses, and obsoleting billions of radio devices, all of which depend on the current configuration of the 902-928 MHz band.

As input for the Commission in making its decision about granting NextNav’s request, the Commission has also received numerous comments from individuals and small organizations such as ARRL, Open Research Institute, and Meshtastic that attest that the 902-928 MHz band fills a unique role for personal data communications, including a role in personal emergency data communications. 902-928 MHz has become a de facto “Citizen’s Data Radio Service”, even though such a role was not envisioned, or nor is formally recognized, as a use of the 902-928 MHz band.

In my opinion, the Commission should deny NextNav’s request to reconfigure the 902-928 MHz band. Making no changes to the current configuration of the 902-928 MHz band would serve the broadest possible public interest of American businesses and individuals. Making no changes to the current configuration of the 902-928 MHz band would allow the band to remain its role as a vibrant spectrum ecosystem of many divergent uses, all of which are figuring out, dynamically, how to operate their systems while cooperating with other systems.

Background

I am an Amateur Radio Operator (callsign N8GNJ), licensed for nearly 40 years. I am a GMRS user (callsign WRPS598). I also had a Citizens Band license - callsign KBFZ8271. My professional background is an Electronic Technician, computing System Administrator, Network Manager, and Technology Writer. I live in Bellingham, Washington. I write a weekly independent newsletter called Zero Retries (www.zeroretires.org) that highlights

technological innovation occurring in Amateur Radio worldwide.

My primary interest within Amateur Radio is operating data communications modes, experimentation, and helping to develop, prove out, and document new radio-based data communications modes. In Zero Retries every week, I document the remarkable evolution in radio technology occurring in Amateur Radio based on new technologies such as Software Defined Radio (software and hardware), Digital Signal Processing, novel and new antenna techniques, use of multiple inexpensive receivers and many other fascinating new approaches and technologies applied to old problems in radio communications.

In short, I posit to the 2100+ readers of Zero Retries that Amateur Radio is a literal license to experiment with radio technology, with low barriers to entry, especially in the Amateur Radio VHF / UHF bands of which 902-928 MHz is one.

While my primary standing to comment on Docket 24-240 is my perspective as an Amateur Radio Operator, I also feel qualified to comment on Docket 24-240 as a member of the general public (a citizen) who uses 902-928 MHz for experimental and education purposes, as well as mundane uses of 902-928 MHz such as a cordless telephone that was specifically chosen for its operation on 902-928 MHz to not be interfered by my wireless systems operating on 2.4 GHz.

902-928 MHz Has Become the Starting Point of Personal Experimentation and Self Training in Radio Technology

In past eras, the Amateur Radio service was regarded as the “entry point” for individuals that were interested in doing personal experimentation and self training in radio technology.

For various reasons (most of which aren’t germane to this discussion), in the last half-decade, experimentation with radio technology using data communications in 902-928 MHz has become the new “entry point”. Some primary reasons for this change are:

- No individual license (Amateur Radio, or GMRS) is required,
- Equipment is to do such experimentation, typically with (free) Meshtastic software operating on LoRa hardware is inexpensive,
- Individuals can self-educate because the information about using Meshtastic and creating individual nodes and relay stations is widespread, and
- Individuals can form their own electronic communities using Meshtastic, either for family use, or community use, or on the basis of shared interests.

Some of these Meshtastic users, after having hands-on experience with radio technology, will go on to become licensed for Amateur Radio. Others will prefer to continue their experimentation and usage in the “unlicensed, more flexible” realm of the 902-928 MHz band and other unlicensed bands because of various restrictions on Amateur Radio operations, including that encryption cannot be used (with very limited exceptions) on Amateur Radio.

With that experience, those users will have a better understanding of the fundamentals of radio technology, and be better equipped than 99% of the public in potentially becoming a member of the “Spectrum Workforce”.

Growing the Spectrum Workforce

As documented by the Biden Harris Administration’s November 13, 2023 National Spectrum Strategy (NSS) document, Pillar Four - Expanded Spectrum Expertise and Elevated National Awareness, there are three Strategic Objectives:

- Strategic Objective 4.1 | Attract, train, and grow the current and next-generation spectrum workforce.
- Strategic Objective 4.2 | Improve policymakers’ understanding of spectrum considerations.
- Strategic Objective 4.3 | Improve the public’s understanding of radio frequency spectrum and raise awareness of its role in everyday life.

I posit to the Commission that though the Commission and its actions are not specifically mentioned in the NSS, Pillar Four, or the three Strategic Objectives, the Commission by its actions in Docket 24-240 will determine the continued usability of the 902-928 MHz band, which will have a significant influence on the three Strategic Objectives, as discussed below.

Strategic Objective 4.1 | Attract, train, and grow the current and next-generation spectrum workforce.

“Attract” is directly related to the continued usability of the 902-928 MHz band for personal experimentation and usage for data communications. Unlicensed devices such as Meshtastic, operating in the 902-928 MHz band offer a low barrier to entry for radio technology experimentation, and that low cost is especially important to encourage those in disadvantaged situations to be able to gain hands on experience with radio technology.

While Meshtastic is a great “entry point” for use of 902-928 MHz because of its ease of use and low cost, there are other systems that can be personally experimented with in the 902-928 MHz band:

- 802.11ah / HaLow - much faster data communications than Meshtastic, similar range, and still relatively low cost. The 802.11ah network protocol was specifically designed for < 1 GHz bands worldwide, but one of the primary bands is the “Americas” 902-928 MHz band. The HaLow certification insures interoperability between different manufacturers, and thus a diversity of manufacturers, functions, price points, form factors, from embeddable boards to complete access points similar to conventional Wi-Fi units.
- Z-Wave is not only used for personal / home automation, but it scales up in to commercial and industrial systems. One can experiment with Z-Wave technology in their home, and apply that knowledge directly in a professional career.
- Amateur Radio offers nearly unlimited potential for personal experimentation with radio technology, including in the 902-928 MHz band. While many Amateur Radio commenters describe how their 902-928 MHz repeater systems are “forced to the band edges where the noise is lowest”... those repeaters are typically using analog Frequency Modulation (FM) technologies that generally require a “clear frequency”. Digital systems deal with interference much better because they can employ Forward Error Correction (FEC). Thus Amateur Radio is a “proving ground” for dealing with interference in a crowded band without resorting to “brute force” methods required for older technologies to deal with interference such as “clearing out all other users”.

One example of innovation in Amateur Radio is a new Digital Voice and Data system called the M17 Project (<https://m17project.org/>) which is an

entirely open source system designed by Amateur Radio Operators for Amateur Radio. M17 is attracting new experimenters into Amateur Radio which were previously disinclined to do so because current Digital Voice repeaters use proprietary technology. Because of its open source nature, M17 is innovating rapidly. One example is the experimental addition of cryptographic signatures (not encryption) of transmissions so that “spoofing” of transmissions can be detected.

Strategic Objective 4.2 | Improve policymakers’ understanding of spectrum considerations.

“Policymakers’ understanding” speaks directly to the Commission’s role in understanding the rapidly improving capabilities of radio technology and the ability for different radio technology systems to coexist in the same spectrum.

In the constraint of “the entirety of the usable electromagnetic spectrum has been allocated to some service”, any new radio based services will inevitably have to share spectrum with other uses, or undergo a disruptive reconfiguration.

As American society has converted from wired communications infrastructure to radio based communications infrastructure, the economic cost of the latter approach has reached the point of being non-feasible. Thus “spectrum sharing” is now the most cost-effective and efficient system of creating new radio services.

The Commission has implemented a number of innovative spectrum sharing systems such as CBRS, sharing the portion of the 5 GHz band used for Weather RADAR with Wi-Fi, unlicensed use of the 6 GHz band, and TV White Space to use vacant television broadcast channels for broadband Internet access.

Each of those systems have required highly proscriptive rules or elaborate new infrastructure. To use the 5 GHz Weather RADAR spectrum required new generations of Wi-Fi chipsets that would detect Weather RADAR transmissions and shift off those frequencies automatically. To allow the use of military RADAR frequencies around 3.5 GHz required the deployment of a vast network of receivers, infrastructure, and the creation of a “permission requested to use this channel” protocol. Similarly, TV White Space systems required the deployment of a similar infrastructure for a “permission requested to use this channel” protocol.

But none of that is used in the 902-928 MHz band. There is no mandated protection built into chipsets, nor is there any external “permission requested” protocols or infrastructure. Within the 902-928 MHz band there are systems *as diverse as...*

- RFID chips for retail and warehouse logistics,
- Extensive networks for automatic toll collection,
- Internet of Things networks such as Z-Wave, Amazon Sidewalk network, and LoRa,
- Experimenters deploying Meshtastic and 802.11ah / HaLow networks,
- Amateur Radio “Earth Moon Earth” operations operating at very high power (but focused on the Moon).

All of those very diverse uses are demonstrably coexisting with the 902-928 MHz band., again, with no mandated protection built into chipsets, nor any external “permission requested” protocols or infrastructure.

Another example of innovation in the 902-928 MHz band is spectrum sharing “underlay” techniques such as Frequency Hopping Spread Spectrum. FHSS was one of the first spread spectrum systems in use when the ISM bands were allowed to be used for communications. FHSS use in 902-928 MHz continues to the present day. FHSS is highly effective, but its potential data rate is less than what can be accomplished with other technologies such as OFDM and DSSS, so its use is less “visible”. Demonstrably, FHSS technology works by its continued use in the 902-928 MHz band, and potentially could be used in other bands as an underlay using faster hopping patterns, lower dwell times, and lower transmit power enabled by vastly improved digital system gain. Bluetooth has become even more usable over time in the 2.4 GHz band despite that band being used very aggressively by Wireless LANs such as Wi-Fi, and even analog “wireless television” cameras.

How is this possible? How can such a “free for all, ad-hoc, anything goes” spectrum sharing model be applied to future needs for new services when “virgin spectrum” can no longer be allocated or created by reallocation of existing services?

In the 902-928 MHz band as currently configured, the Commission has a perfect “laboratory” for observing rapid technological evolution in spectrum sharing. It only has to carefully observe what is actually happening in that band, perhaps by setting up a “spectrum observatory” in a selected, representative city such as Columbus, Ohio. Provably the current model of regulation in the 902-928 MHz band is working well. All that the Commission has to do to “continue the experiment” is to not radically disturb the unique spectrum ecosystem in the 902-928 MHz band.

Strategic Objective 4.3 | Improve the public’s understanding of radio frequency spectrum and raise awareness of its role in everyday life.

In my opinion, this Objective *could not be more directly related* to the situation represented by Docket 24-240.

Thanks to media mentions such as from Meshtastic, Electronic Frontier Foundation, ARRL, (and, modestly, Zero Retries) and notifications from the *many* commercial users of 902-928 MHz, the (techie) “public’s understanding of radio frequency spectrum and raise awareness of its role in everyday life” has quickly become prominent.

The most impactful action that the Commission can undertake in supporting the Biden Harris Administration’s National Spectrum Strategy, Pillar 4, Strategic Objective 4.3 to improve the public’s understanding of radio frequency spectrum and raise awareness of its role in everyday life...

... is to allow the continued, current use by the public, using unlicensed (Part 15) equipment, of the entirety of 902-928 MHz band. To use a resource is to appreciate it, understand it, and support it, be it roads, schools, public parks... or spectrum.

If there are not places in the electromagnetic spectrum where the public can use spectrum directly, hands-on, experimentally, with low barriers to entry (even lower than Amateur Radio, which requires a technical examination, and a lot of “domain knowledge”) then we will be relegated to be a nation of “app users” with no appreciation or understanding of the role of spectrum in everyday life.

And if that comes to pass, we will be poorer and less secure and less self-sufficient in the primary technology of radio technology.

In Conclusion

In Docket 24-240, NextNav has proposed a radical reconfiguration of the 902-928 MHz band. If adopted, NextNav's reconfiguration will be highly disruptive, and in most cases destructive (no practical or cost effective way to adapt to the reconfiguration) to hundreds of systems and billions of individual units that use 902-928 MHz daily.

Beyond the currently incalculable financial cost of disrupting commercial systems that currently use the 902-928 MHz band, and the obsolescence of billions of electronic units, if the Commission reconfigures the 902-928 MHz band per NextNav's request, the American public will suffer an enormous loss of opportunity for personal use of the 902-928 MHz band.

The use of 902-928 MHz as a de facto "Citizens Data Radio Service" would be severely impacted. If the band were reconfigured per NextNav's request, "cramming" all unlicensed use into a mere 11 MHz (907-918 MHz), it would not be cost-effective for most unlicensed uses to attempt to adapt.

Such a situation would be the commercial equivalent of "mere app users", buying service on other systems, with no resiliency or independent operations capability. Imagine a commercial lighting system that currently uses Z-Wave on 902-928 MHz that was forced to be converted to use cellular technology. Then we'd be in an absurd situation where if the cellular network were unavailable... *you cannot even turn the lights on*. Even worse, electric utilities, or water utilities, or gas utilities could not monitor their local distribution systems for service outages, or breaks (bad for water main breaks, catastrophic for gas pipeline breaks).

Managing the Radio Spectrum for the Broadest Possible Public Interest

In the most broad perspective of the Commission's "mission", it is to manage the portion of the electromagnetic spectrum that is "usable for radio communications" to the highest and best use for the broadest possible public interest. In my initial comment, I cited the easiest example of radio spectrum management highest and best use of the broadest possible public interest was sinking of the Titanic. The subsequent rescue of passengers, in time, before they perished from exposure, was the result of then new radio technology. The aftermath of the Titanic sinking required new management of radio spectrum to make ship communications reliable. That management required making some hard decisions about "highest and best use" of competing user communities (such as segmenting radio broadcasting and ship communications into separate portions of the radio spectrum) and choosing between competing technologies to effectively use limited radio spectrum.

In Docket 24-240, the Commission is again tasked with making decisions about "highest and best use" of competing user communities and competing technologies to effectively use the limited radio spectrum of the 902-928 MHz band. In the totality of the unique nature of the 902-928 MHz band, the diverse users and systems that have evolved, and thrived, and profited in the 902-928 MHz band as it is currently configured...

In my opinion, NextNav's proposed reconfiguration of 902-928 MHz is not in the broadest possible public interest.

Thus I recommend to the Commission that NextNav's proposed reconfiguration of 902-928 MHz in Docket 24-240 *should be denied*.

Signed,
Steven K. Stroh
P.O. Box 30725
Bellingham, Washington, USA

Leave a comment

Share

ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

[WCF Experimenter Newsletter](#)

Welcome to the new home of THE WCF EXPERIMENTER, formerly known as THE EXPERIMENTER, the official technical newsletter of the ARRL West Central Florida Section.

There were fourteen issues of this newsletter published between 2013 and 2020. It was published by the ARRL West Central Florida Section and its format and content is very similar to Zero Retries. This could easily be, *should be*, an official publication of ARRL as a "lighter, more hands on" technical newsletter than ARRL's QEX. But then, I'm glad it's not because all of these newsletters are available to everyone, worldwide, and not hidden behind a paywall such as QEX is where it can only be accessed by < 20% of US Amateur Radio Operators that are currently ARRL members.

I've emailed two of the principals of WCF Experimenter, Darrell Davis KT4WX and Jim Weslager K3WR, complimenting them on the excellent content.

The 18.25 meter dish in Wall Township, New Jersey, US (FN20xe) is expected to return to service on 1296 Mhz before the end of 2024.

Martin Flynn W2RWJ on the Facebook group Earth Moon Earth (EME) Radio Communications:

The 18.25 meter dish in Wall Township, New Jersey, US (FN20xe) is expected to return to service on 1296 MHz before the end of 2024.

A bearing failed in the elevation drive, requiring removal of the drive assembly for non-destructive testing and evaluation. While the drive system was down, work continued on the control console, adding UHF and VHF radios, and the initial control system to support the VHF and UHF yagi antennas.

Earlier testing under remote control (actual speed)

Infoage Space Exploration Center

<https://isec.space/>

In a visit to New Jersey several years ago I visited this facility in Wall, New Jersey and it's an amazing facility for Amateur Radio. How could a visiting kid who's "trending towards techie" not be interested in that awesome dish and being able to use it for bouncing radio signals off the Moon? The dish and all of the control equipment was built decades ago for government use and it's long since been deeded over to the nearby Infoage Museum. It's all Amateur Radio activity now. At the time I visited, I was told that the bearing mentioned above was entirely custom to that particular dish and had to be fabricated from scratch... not to mention the very cautious removal of the bad bearing. Thus it's been a slow, expensive process to replace that bearing and get the dish back to full capability. I tried to "pass the word" about the potential of ARDC grant funding to help finance the bearing replacement, but the volunteer I tried to discuss it with had no interest.

RPC Electronics SMT NinoTNC Going Out of Production

On the RPC Electronics page for the SMT NinoTNC:

We are ceasing production of the SMT NinoTNC. Please contact us directly regarding remaining inventory.

This is an unfortunate development.

I quickly ordered two more units so I can have them for experimentation. These units work well and are sold *assembled and tested*.

I hope there is a possibility that the SMT NinoTNC could be put back into production. While I'm of the generation where soldering up a PCB and sourcing all the components can be an enjoyable exercise, that's not the perspective of a lot of new folks entering into Amateur Radio to hack on software, Software Defined Radio, and especially networking. They're unpracticed, and thus uncomfortable using a soldering iron and saying to them "*Oh, soldering is easy, just try it*" isn't helpful. (That said, soldering can be fun, with practice, but that really requires some mentoring, which can be a good group project.)

Thus RPC Electronics' SMT NinoTNC, assembled, tested, plug and play was a game changer because it made the NinoTNC usable by folks that otherwise wouldn't consider it. There's a lot of innovative technology in the NinoTNC including the new 3600 bps mode that works great even using speaker and microphone connections to any radio, the Improved Layer 2 Protocol (IL2P) Forward Error Correction, an improved HF mode, and many other subtle and potential features.

If you order one out the remaining inventory, be sure to tell RPC Electronics' Jason Rausch K4APR that he did a great job with the SMT NinoTNC. Perhaps he'll reconsider and put it back into production. That's what I told him when I ordered mine.

Leave a comment

Share

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out

Join the Fun on Amateur Radio for some pointers.

Zero Retries Frequently Asked Questions (FAQs) — In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio

technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing *Thanks* to:

- Tina Stroh KD7WSF for, well, *everything*!
- **Annual Founding Members who generously support Zero Retries financially:**
Founding Member 0000 - Steven Davidson K3FZT (Renewed 2024)

Founding Member 0001 - Prefers to Remain Anonymous 01 (Renewed 2024)
Founding Member 0002 - Chris Osburn KD7DVD (Renewed 2024)
Founding Member 0003 - Don Rotolo N2IRZ (Renewed 2024)
Founding Member 0004 - William Arcand W1WRA (Renewed 2024)
Founding Member 0006 - Todd Willey KQ4FID (Renewed 2024)
Founding Member 0007 - Merik Karman VK1DF / VK2MKZ (Renewed 2024)
Founding Member 0008 - Prefers to Remain Anonymous 14
Founding Member 0009 - Prefers to Remain Anonymous 19
Founding Member 0011 - Rick Prelinger W6XBE
- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

Want to Support Zero Retries?

- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.
- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your [QRZ](#) page (or other web presence) and include a link:

<https://www.zeroretires.org>
- If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR:
Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- [Dan Romanchik KB6NU](#) mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- [Jeff Davis KE9V](#) also mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- [Amateur Radio Weekly](#) by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories that often feature "Zero Retires Interesting" topics.
- [Experimental Radio News](#) by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It's a *must-read-now* for me!
- [RTL-SDR Blog](#) - *Excellent* coverage of Software Defined Radio units.
- [TAPR Packet Status Register](#) has been published continuously since 1982.
- [Hot Iron - The Journal of the Constructor's Club](#) is a delightful quarterly newsletter.
- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- [HB9BLA Wireless](#) by Andreas Spiess HB9BLA
- [KM6LYW Radio](#) by Craig Lamparter KM6LYW (home of the [DigiPi project](#))
- [Modern Ham](#) by Billy Penley KN4MKB
- [Tech Minds](#) by Matthew Miller M0DQW

These podcasts regularly feature Zero Retries Interesting content:

- [Store and Forward](#) - a podcast about the past and future of amateur radio, by Kay Savetz K6KJN (curator of the [Digital Library of Amateur Radio and Communications](#)) and Steve Stroh N8GNJ (Editor of Zero Retries).
- [Ham Radio Workbench](#) by George Zafiropoulos KJ6VU (and friends)
- [Foundations of Amateur Radio](#) by Onno Benschop VK6FLAB

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join **2100+** other subscribers:

Subscribe now

Please tell your co-conspirators about Zero Retries — just click:

Share Zero Retries

Offering **feedback or comments** for Zero Retries is equally easy — just click:

Leave a comment

If you're a fellow smart person that uses **RSS**, there *is* an **RSS feed for Zero Retries**.

Social Media:

Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

[Zero Retries / N8GNJ on Mastodon](#)

Zero Retries (N8GNJ) is also on Bluesky — [@n8gnj](#) — just click:

[Zero Retries / N8GNJ on Bluesky](#)

Email issues of Zero Retries are “instrumented” by [Substack](#) to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- [SuperPacket blog](#) — *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- [N8GNJ blog](#) — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs in Bellingham, Washington, USA*

Thanks for reading!

Steve Stroh N8GNJ / WRPS598 (He / Him / His)

These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham ([The City of Subdued Excitement](#)), Washington, USA, and linked to the Internet via [Starlink Satellite Internet Access](#).

2024-09-20

Blanket permission is granted for TAPR to use any Steve Stroh content in Zero Retries for the TAPR Packet Status Register (PSR) newsletter (I owe them from way back).

Blanket permission is granted for Amateur Radio use of any Steve Stroh content in Zero Retries for Amateur Radio newsletters and distribution via Amateur Radio such as (but not limited to) Packet Radio Networks, Packet Radio Bulletin Board Systems, Repeater Nets, etc.

In such usage, please provide appropriate authorship credit for the content.

If you'd like to republish an article in this issue for other uses, just ask.

All excerpts from other authors or organizations, including images, are intended to be [fair use](#). *Unless otherwise noted in the article*, there are no paid promotional items in any Zero Retries articles.

Portions Copyright © 2021, 2022, 2023, and 2024 by Steven K. Stroh.

Footnotes for this Issue

[1](#)

This is mostly from memory; I've probably got details of this wrong, but I think the analogy is worth offering.